ORIGINAL ARTICLE

Prenatal exposure and risk of medication in Autism spectrum disorder.

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ABSTRACT… Objective: To investigate correlations between prenatal medication exposure and ASD risk. **Study Design:** Cross-Sectional Observational Study. **Setting:** Department of Speech Language Pathology, The University of Lahore. **Period:** 22nd April 2024 22nd October 2024. **Methods:** Involving 45 mothers of autistic children. The research spanned 12 months, employing a purposive sampling technique and a self-designed questionnaire. Data analysis utilized SPSS software, focusing on demographic characteristics and questionnaire responses. **Results:** Findings reveal a variety of factors potentially associated with ASD, including abrupt medication changes (26.7%), pre-clampsia (35.6%), maternal age (60% within 25-30 age group), neurological conditions (37.8%), cousin marriages (37.8%), and complications during delivery (22.2%). The study emphasizes the complexity of ASD and highlights potential risk factors. **Conclusion:** The research concludes that while no specific prenatal factor is implicated in ASD etiology, certain associations suggest that exposure to pregnancy complications may increase the risk. The study underscores the need for a nuanced understanding of ASD and early intervention strategies.

INTRODUCTION

Autism Spectrum Disorder (ASD) represents a profound and pervasive developmental challenge, significantly affecting communication and social interaction across an individual's lifespan. Typically diagnosed in childhood, ASD introduces a complex array of hurdles, impacting verbal and non-verbal communication, behavioural patterns, attachment dynamics, and cognitive functions.[1] This condition, characterized by a spectrum of symptoms and severity, results in a unique experience for each individual.The recognition and formal diagnosis of autism only emerged in 1943, with Donald Grey Triplett marking the first documented case. Born in Mississippi in 1933, Triplett's diagnosis by Dr. Leo Kanner led to the identification and classification of autism as "case 1." Initially, features associated with autism were incorporated under schizophrenia. The acknowledgment of autism as a distinct entity paved the way for further research and understanding, evolving into a multidimensional developmental disorder encompassing various characteristics.[2]

Referred to as Autism Spectrum Disorder due to the vast variability in its presentation, ASD manifests with a spectrum of characteristics and severity levels. Individuals with ASD may exhibit highly developed verbal skills or face significant communication challenges. Social interaction difficulties, poor eye contact, and repetitive behaviors are common traits.[3] The uniqueness of each person's experience underscores the intricate nature of ASD, with symptoms ranging from mild to severe and subject to change over time. The diagnostic criteria include challenges in social interaction, communication issues, and restricted/repetitive behavioral patterns.

The precise causes of ASD remain elusive, but various factors are suspected contributors. Genetic elements play a pivotal role, with research indicating a strong familial link. Environmental factors such as exposure to heavy metals, prenatal medication, and maternal health during pregnancy are also considered. Contrary to misinformation, vaccines have been scientifically discredited as a cause of ASD.

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The complexity of ASD is further underscored by the presence of comorbid conditions and the influence of parental age and mental health.[4]

Diagnosing ASD involves assessing three key developmental domains: social interaction, communication, and repetitive behaviors. Lack of empathy, language difficulties, and repetitive actions are commonly observed. The absence of a standardized laboratory test necessitates reliance on behavioral observations and checklists. A comprehensive understanding of an individual's behavioral patterns and social interactions becomes crucial for accurate diagnosis.[5]

This research aims to explore the prenatal exposure to medications as a potential environmental factor contributing to the development of ASD. ASD's etiological factors involve a complex interplay of genetics and environment, with epigenetics playing a significant role. Maternal exposure to certain medications during pregnancy has been associated with an increased risk of ASD. Understanding these environmental contributors is crucial for comprehensive insights into the origins of ASD and developing effective strategies for prevention and intervention.[6]

METHODS

A Cross-Sectional Observational Study design was employed to gather insights into the prenatal exposure of medication and its potential correlation with Autism Spectrum Disorder (ASD). The research was conducted at the Department of Speech Language Pathology, The University of Lahore from 22nd April 2024 22nd October 2024. with a specific focus on the mothers of autistic children as the target population over duration of 12 months after obtaining approval from the Research Ethical Committee (REC-UOL-119-06-2023-19/6/23). The sample size for this study was determined at 45 participants, chosen with a 90% confidence level and a 10% margin of error. The inclusion criteria comprised mothers with autistic children, while speech therapists were excluded from participation. To collect relevant data, a self-designed questionnaire served as the primary data collection instrument. The questionnaire was formulated based on expert opinions and an extensive review of existing literature in the field. The target participants for data acquisition were mothers of autistic children, ensuring a direct and informed perspective on the variables under investigation.

The methodology employed a purposive sampling technique, enabling the selection of participants with specific characteristics relevant to the research focus. This approach aimed to provide a concentrated and relevant dataset for analysis.

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software, version 20, a standard tool for statistical analysis. Descriptive statistics, including mean and standard deviation (Mean ± SD), were utilized to summarize continuous variables. The choice of statistical methods aimed to facilitate a comprehensive understanding of the relationships between prenatal medication exposure and the presence of Autism Spectrum Disorder. In summary, the research methodology involved a targeted and specific approach, utilizing a well-designed questionnaire to collect data from a carefully selected sample of mothers of autistic children. The adoption of a cross-sectional observational study design and purposive sampling technique, coupled with robust statistical analysis using SPSS, contributed to a rigorous and systematic investigation into the variables of prenatal medication exposure and Autism Spectrum Disorder.

RESULTS

The study comprised 45 mothers of autistic children, with a diverse distribution across age groups. The majority fell within the 25-30 age bracket (60%), followed by those aged 35-40 (22.2%). A smaller percentage represented the age groups of 20-25 (15.6%) and 45-50 (2.2%). Regarding family history, 22.2% reported a neurological disorder in their family, with 37.8% indicating a history of depression. Additionally, 37.8% acknowledged cousin marriage within their families, and 15.6% reported a neurological condition in their husbands. The study also explored complications during delivery, with 22.2% of participants experiencing such issues as shown in table No.1.

TABLE-I		
Demographic characteristics of participants		
Characteristic	Frequency	Percentage
Age (years)		
20-25	7	15.6
25-30	27	60
35-40	10	22.2
45-50	1	2.2
Neurological Disorder in Family		
Yes	10	22.2
No	31	68.9
Maybe	4	8.9
Cousin Marriage		
Yes	17	37.8
No	28	62.2
Husband's Neurological Condition		
Yes	7	15.6
No	28	62.2
Maybe	10	22.2
Cousin Marriage		
Yes	17	37.8
No	28	62.2

The research questionnaire delved into various aspects related to prenatal exposure and potential factors contributing to autism spectrum disorder. Participants, comprised of mothers with autistic children, were probed on lifestyle, medications, and environmental factors during pregnancy.

Responses revealed a significant portion of mothers (26.7%) abruptly stopped medications, raising concerns about the potential impact on their offspring. Additionally, a considerable number of participants (35.6%) reported experiencing pre-clampsia during pregnancy, a condition associated with an increased risk of autism spectrum disorder.

In exploring the age of conception, a predominant percentage fell within the 25-30 age group (60%), indicating a potential correlation between maternal age and autism. Neurological conditions, both in participants and their family members, were scrutinized. Depression was reported by 37.8%, emphasizing the need to understand the interplay of mental health factors in autism.

Genetic considerations were examined, with 22.2% reporting a family member with autism. This underscores the genetic component in autism spectrum disorders. The prevalence of cousin marriages among participants (37.8%) adds complexity to the genetic landscape and potential risk factors.

Herbal medication usage during pregnancy was minimal (2.2%), aligning with broader health recommendations. Complications during pregnancy, such as panic attacks (22.2%), were reported. Notably, 75.6% of participants consulted physicians about their medications, reflecting a proactive approach to mitigate potential risks.

The study touched upon cousin marriages, a factor observed in 37.8% of participants. While previous research suggests a link between paternal neurological conditions and autism, only 15.6% reported such conditions in their husbands.

Complications during delivery were acknowledged by 22.2% of participants, contributing to the broader discussion on the role of birth-related factors in autism. Notably, 42.2% did not fill a consent form before treatment, indicating a potential gap in understanding the risks associated with medical interventions during pregnancy.

Awareness about prohibited medications during pregnancy varied, with 26.7% lacking this knowledge. Additionally, 28.9% did not have the opportunity to discuss medication risks, highlighting potential challenges in disseminating information.

The study revealed that 26.7% of participants had switched or stopped medications without consulting their doctors. This points to a need for improved communication between healthcare providers and expectant mothers.

Awareness of medication adverse effects varied, with 24.4% lacking knowledge. The occurrence of viral infections after conceiving (8.9%) adds another layer to the exploration of environmental factors in autism.

Metabolic changes during conception, such as fatigue (11.1%) and muscle cramps (17.8%), were reported. Finally, 28.9% of participants were unaware of changes in their child during the first 6 months, emphasizing the challenges in early detection and intervention for autism spectrum disorder.

These questionnaire responses collectively contribute to a nuanced understanding of the multifaceted factors potentially influencing autism spectrum disorders as shown in Table-II.

TABLE-II		
Questionnaire responses		
Question	Frequency	Percentage
Prenatal Exposure of Medication		
Depression	17	37.8
Panic Attack	10	22.2
Cousin Marriage	17	37.8
Paternal Neurological Condition	7	15.6
Underweight Child After Birth	9	20
Complications During Delivery	10	22.2
Muscle Cramps	8	17.8
Fatigue	5	11.1
Suddenly Stopped Medications	12	26.7
Viral Infection	4	8.9
Pre-clampsia	16	35.6
Environmental Issues	4	8.9
Age When Conceived Child		
20-25	7	15.6
25-30	27	60
35-40	10	22.2
45-50	1	2.2
Neurological Conditions in Family		
Depression	17	37.8
ADHD	2	4.4
OCD	1	2.2
None	25	55.6
Autism in Family		
Yes	10	22.2
No	31	68.9
Maybe	4	8.9
Herbal Medications During Pregnancy		
Ethanol Consumption	1	2.2
Excessive Use of Vitamins	1	2.2
None	43	95.6
Complications During Pregnancy		
Unconsciousness	3	6.7
Nervous Breakdown	1	2.2
Panic Attack	10	22.2
None	31	68.9
Consultation with Physician		
Yes	34	75.6
No	9	20
Maybe	2	4.4
Cousion Marriage		
Yes	17	37.8
No	28	62.2
Husband's Neurological Condition		
Yes	7	15.6
No	28	62.2
Maybe	10	22.2
Complications During Delivery		
Yes	10	22.2
No	34	75.6
Maybe	1	2.2
Filled/Read Treatment Form		
Yes	23	51.1
No	19	42.2
Maybe	3	6.7
Awareness of Prohibited Medications		
Yes	31	68.9
No	12	26.7
Maybe	2	4.4
Awareness of Risks and Consultation		
Yes	31	68.9
No	13	28.9
Maybe	1	2.2
Sudden Stop or Switch of Treatment		
Yes	12	26.7
No	32	71.1
Maybe	1	2.2
Knowledge of Medication Adverse Effect		
Yes	31	68.9
No	11	24.4
Maybe	3	6.7
Viral Infections After Conceiving		
Yes	4	8.9
No	37	82.2
Maybe		

DISCUSSION

The results of the study shed light on various factors potentially associated with autism spectrum disorder (ASD) in children, emphasizing the complexity of the disorder. Correlating these findings with previous studies provides valuable insights into the existing body of knowledge.[7]

One notable aspect is the prevalence of abrupt medication changes reported by 26.7% of participants. This aligns with studies that have explored the impact of maternal medication during pregnancy on neurodevelopment. Research, such as that conducted by Rai et al. (2018), emphasizes the need for caution in altering medications without medical consultation, as certain drugs may pose risks to fetal development.[8]

The reported cases of pre-clampsia (35.6%) during pregnancy are consistent with studies linking maternal hypertensive disorders to an increased risk of ASD. A study by Mann et al. (2016) found a significant association between pre-clampsia and neurodevelopmental disorders in offspring, reinforcing the idea that prenatal complications may contribute to the etiology of ASD.[9]

The age of conception, with a majority falling within the 25-30 age group (60%), correlates with existing literature indicating a maternal age effect on autism risk. Advanced maternal age has been identified as a potential risk factor, supported by studies like Sandin et al. (2016), which reported an increased risk of ASD in children born to mothers over the age of 35.[10] Neurological conditions, particularly depression (37.8%), within the study participants and their family members, align with research emphasizing the role of maternal mental health in autism risk. A study by Brown et al. (2019) highlighted the association between maternal depression and an elevated risk of ASD in offspring, suggesting the importance of mental health considerations in prenatal care.[11]

The prevalence of cousin marriages (37.8%) among participants adds a genetic dimension to the study. While cousin marriages themselves may not directly correlate with ASD risk, genetic factors intertwined with familial relationships have been explored in studies like Ghaziuddin et al. (2002), emphasizing the intricate genetic landscape of ASD.[12]

Complications during delivery reported by 22.2% of participants correlate with studies investigating perinatal factors and their association with ASD. Previous research, such as that by Gardener et al. (2009), has identified birth-related complications as potential contributors to neurodevelopmental disorders, including ASD.[13]

The lack of filled consent forms before treatment in 42.2% of participants echoes concerns raised in studies emphasizing the importance of informed consent during pregnancy. Research by Haw et al. (2017) stresses the significance of comprehensive communication between healthcare providers and expectant mothers to ensure informed decision-making.[14]

In summary, the discussion of the questionnaire results aligns with existing research, providing contextualization to the multifaceted factors associated with autism spectrum disorder. The correlations drawn from previous studies enhance the understanding of the complex interplay between prenatal factors and the risk of ASD in children.[15]

CONCLUSION

On the basis of obtained findings it is concluded that the evaluation there is insufficient evidence to implicate any one prenatal factor in autism aetiology, although there is some evidence to suggest that exposure to pregnancy complications may increase the risk.

LIMITATIONS

Lack of knowledge of health precautions influences the rate of autism in children. Limited time span for the research can cause variation in the results. Individual opinion of every participant can affect the background of the research. Lack of standardized practice for autism assessment in special settings influences the uniformity of opinion on autism related difficulties in children with childhood disorders.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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2	**Hamza Manzoor:** Discussion writing, review of manuscript.
3	**Saira Zaman:** Data collection.
4	**Athar Adnan Uppal:** Literature review.
5	**Nasir Riaz:** Data entry.
6	**Aysha Nauman:** Critical revision.